

DOCUMENT RESUME

ED 188 782

PS 011 573

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TITLE Individual Patterns in Intrinsic Motivation.
PUB DATE 80
NOTE 22p.: Paper presented at the Annual Meeting of the Southwestern Psychological Association (Oklahoma City, OK, April 10-12, 1980). Best copy available.

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Behavior Problems; Classroom Research; Elementary Education; Elementary School Students; *Problem Childrer; Reinforcement; *Rewards; *Student Interests; *Student Motivation
IDENTIFIERS *Overjustification Hypothesis; Single Subject Designs

ABSTRACT

The effects of extrinsic reward on students' intrinsic interest was investigated using a single-subject design in a behavior disorders classroom. Baseline measures of the interest level of five children (ages 9-11 years) were collected for academic and non-academic tasks. Assessment was then made of each subject's response hierarchy or level of interest in each of four activities: math, reading, coloring, and a spirograph game. Subsequently, children were instructed that if they were working when a timer went off, they would then receive a token which could be exchanged for erasers. Children were rewarded for work on their most preferred activity. Following this phase, the rewards were withdrawn. While the effect of reward withdrawal was highly variable across the children there was little evidence of any long-term losses in intrinsic interest. (Author/SS)

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Individual Patterns in Intrinsic Motivation.¹

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ABSTRACT

Investigators have reported instances of extrinsic rewards undermining a child's intrinsic interest in a task. Our research involved the use of single-subject designs. Specifically, we collected baseline measures of the interest level of five children in academic and non-academic tasks. The most preferred of these was then rewarded and subsequently the rewards withdrawn. While the effect of reward withdrawal was highly variable across the children there was little evidence of any long-term losses in intrinsic interest.

1. Paper presented to Southwestern Psychological Association, Spring, 1980, as part of a symposium entitled, Problems and issues in interpreting the hidden costs of rewards.

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Several authors (Deci, 1975; and Lepper, Greene, & Nisbett, 1973) have argued that extrinsic reward procedures tend to undermine an individual's subsequent interest. According to the "Overjustification Hypothesis", this decrement is due to a cognitive reorganization such that, "I'm doing this because I like it", to "I'm going to do this to get a reward".

In the social psychology literature, involving groups design, there are many published studies demonstrating the detrimental effects of extrinsic rewards on one's intrinsic interest. Negative instances appear in convention proceedings and doctoral dissertations. A much smaller number of published studies in the behavior modification perspective that involve essentially single-subject designs (Reiss & Sushinsky 1975, Feingold & Mahoney, 1975; and Fisher, 1979) have found little support for the overjustification effect, have reported results difficult to interpret (Greene, Stenberg, & Lepper, 1976), or have provided evidence supporting an explanation other than an overjustification one. (Mynatt, Oakley, Arkkelin, Piccione, Margolis & Arkkelin, 1978)

When reviewing the literature, we were concerned about a number of different aspects of this research. Many of these concerns have been mentioned by Mynatt, Oakley, Arkkelin, Piccione, Margolis, & Arkkelin, (1978). First the vast majority of published studies have employed but one baseline assessment of a subject's intrinsic interest in an activity instead of utilizing multiple baseline assessments. Second, past researchers have relied upon the use of a single reinforcement session instead of using several reinforcement sessions. Third, there exists the difficulty of generalizing research findings based upon research data base to that of another. The social psychology literature is often based on groups data

whereas the behavior modification literature is based on single subject designs. Fourth, many of the earlier studies have used a "novel" task rather than employing tasks typically found in the usual classroom setting. It was our intent to use tasks that have base-rates based on a child's normal activities in a classroom setting. We chose a classroom setting for our research in order to examine the possibility that we might be able to gain control over a child's high base-rate behavior through our reinforcement procedures. It is conceivable that high base rate behaviors might be relatively immune to our reinforcement attempts. Fifth, there has been little systematic interest directed toward the effects of extrinsic reward upon other activities in the response hierarchy of the child. For example, a child is given the opportunity to sample four different activities and extrinsic reward is provided for the most preferred activity. When the reward is withdrawn, how are the children's level of intrinsic interest in the other activities influenced? Do the children distribute their time or interest among the other activities equally, , or do the children show an increased interest in the second most preferred activity? Sixth, somewhat surprising, there has not been sufficient concern for the long-term consequences of extrinsic reward upon the child's intrinsic interest in the previously rewarded activity. If the overjustification effect were found to have a lengthy or long term effect as suggested in the work of (Lepper, Greene, & Nisbett, 1973; and Ross, 1973) it raises far greater ethical considerations for the researcher. In view of this possibility, we sought a research setting which would minimize this potential difficulty. We turned to a Behavior Disorders class in a public school setting where many of the teacher's and children's goals are interrupted. Interrupted that is, by the child's often excessive interest (intrinsic) in one activity

to the detriment of his interest in other activities, i.e., reading, writing, and so forth. In conclusion, it was with these 6 considerations in mind, that we chose single-subject designs in a Behavior Disorders setting to examine the effects of extrinsic reward on the subsequent intrinsic interest of the child when these rewards are withdrawn.

Method

Subjects: The five subjects in this project were from a Behavior Disorders class in the Springfield Public Schools. Their ages varied from 9-11 years and they possessed IQ's ranging from 30-100.

Method: This project was conducted by the Behavior Disorders Female Teacher along with her aide within the context of the child's normal classroom activities. Daily testing periods took place at the back of the room and this area was separated from the rest of the class through the use of a screen. This area had been used previously by the BD teacher for special activities or testing.

The project consisted of a single-subject designs, essentially an ABA with one modification, namely the use of what we called a probe session during the B phase (reward training). Unlike the typical ABA design where A is baseline and B is reward training, we included another daily baseline session in addition to the reward session during the B phase. The children were run under reward training in the morning and baseline conditions in the afternoon session. The children were run one time for a $\frac{1}{2}$ hour session in the A sessions and 2 times ($\frac{1}{2}$ hour each) daily during the B sessions.

These probe sessions were included in order to assess whether or not the performance of the child during this time would be an accurate reflection of the child's subsequent performance in A sessions following reward training.

It was explained to each child that they would be given an opportunity to work on any of four different activities. These activities consisted of math, reading, coloring, and a spirograph game. In the first phase (A condition) following baseline condition (8-22 sessions) an assessment was made of each subject's response hierarchy, i.e., level of interest in each of the four activities. Next, in the second phase (B conditions),

the children were instructed that if they were working (highest intrinsic interest activity) when this kitchen aid timer went off they would receive a token which could be exchanged for "itty bitty" erasers at the end of the session. The schedule of reinforcement during the B phase was an VI 2. The reward sessions were conducted in the morning and the probe sessions were run in the afternoon. In the probe sessions, the children were told that we were going to do as before, and that they could work on any of the 4 activities. It was also explained to them that there would be no tokens given in the afternoon sessions. Finally, in the third phase (A condition), the child was returned to baseline conditions and tested but once a day. In two of the children, following ABA sessions with the probe period, various treatment modifications took place, i.e., institution of reward procedures once again for either the high-interest behavior or for the low-interest behavior.

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Method

Subjects: The five subjects in this project were from a Behavior Disorders class in the Springfield Public Schools. Their ages varied from 9-11 years and they possessed IQ's ranging from 80-100.

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Results and Discussion

The first result of interest to us was the baseline assessment of the various activities for the 5 children in our study. As mentioned earlier in the introduction, many or most researchers have assessed baseline interest through the use of a single session. If you will turn your attention to figure 1, we have plotted the two most preferred activities for each child. Somewhat surprising to us, in 4 of the 5 cases, the ordinal position of the most preferred activity was consistent whether employing initial baseline interest averaged interest across the sessions or the last baseline assessment session. However, it is possible to choose individual days in which the rankings of intrinsic interest vary. For example, in figure 2 there is the baseline assessment of interest for the two most preferred activity for a single child over 20 days of baseline. As you can see, coloring is higher than spirographing not only early in the baseline but particularly so in later baseline sessions. But if we had stopped baselining on sessions 5-10, spirographing would appear to be the most preferred activity rather than coloring. On the basis of these data, it appears that the use of single sessions to measure the most preferred activity is adequate. However, when using multiple assessments it might be best to use "averaged" interest as there was considerable day to day variability in our measures of interest.

If you now look at figure 3, we have averaged the data for the 5 children for each of the baseline and treatment phases for their most preferred activity. Evidence in support of the Overjustification Hypothesis, may be seen by comparing A_1 to A_{21} and A_{22} which refer respectively to baseline sessions prior to reward training and baseline sessions occurring early or later in post-reward sessions. When comparing A_1 to A_{21} there is about a 20% decrement and there is little decrement to speak of when comparing A_1 to later baseline sessions, A_{22} .

However, if one looks at the individual graphs for each of the children--one might arrive at a different conclusion. As may be seen in figure 4, by comparing A_1 to A_{21} , evidence in support of the Overjustification notion is seen in Tamara and Neil but not for Bill and Charlie. In the figure, note also the relationship between the probe sessions and post-reward sessions. If you compare the probe sessions to early post-reward training, A_{21} sessions, you see that they are consistent--evidence of decremental effects for Tamara and Neil but not for Bill and Charlie. So in these 4 instances, the probe baseline sessions were consistent with A_{21} sessions. These data suggest that the probe sessions may be used as indicators of whether or not a drop in intrinsic interest will be found as a result of prior reward experience.

Regarding duration effects and recovery, comparing A_1 sessions to A_{22} there were no decrements found in in the cases of Bill and Charlie. There was even an increase in coloring interest from early to late post-reward training for these two children. For Tamara, it took her 30 days to regain her interest in coloring. But for Neil, there was no evidence of recovery but the baseline sessions were terminated after 17 days. Interestingly enough, only Neil showed a clear preference for the spirograph game prior to the introduction of reward training. The other children demonstrated a distinct preference for coloring. Perhaps, the novelty of the game in the school setting contributed to Neil's initial interest which rapidly diminished as the project continued. It is conceivable that coloring has a rather stable high base-rate for the individual compared to the novelty effects contributing to the initial base-rate interest in the spirograph game. If you turn your attention to figure 6, note that in the A_2 sessions, Neil eventually showed a high and pervasive interest in coloring. We then rewarded coloring and his interest level in coloring showed little change when comparing baseline sessions A_2 and A_3 .

In figure 5, we have plotted the interests for the children's two most preferred activities. This figure was directed at the question of the impact of extrinsic reward on the children's interest level on tasks other than the rewarded activity. In the case of Neil and Tamara, there

was evidence of an increase in the interest level of the second most preferred activity as the interest level in the most preferred activity decreased. However, for Bill, Charlie, and Mike this was not the case.

And finally, consider the individual patterns of responding to extrinsic reward. As previously mentioned, there was some evidence in support of the Overjustification notion in that two of the four cases (See figure 3) showed a decrease in interest while the other two did not show a decrease. This finding of a decrement for some but not others is similar to research that we have conducted over the past 4 years involving group designs. Our groups data tend to follow a dichotomous pattern--either they show a great deal of intrinsic interest or none at all during the free-choice situation. The pattern of responding in the present study and that of other researchers indicate to us that there are perhaps subject and/or situational variables prevalent or operative in these situations, e.g., type of task, initial interest, type of reward, sex, and previous reward history.

Figure 1.
Early (A_{11}), average (AV), and late (A_{12}) baseline
levels of the two most preferred activities
for each child.

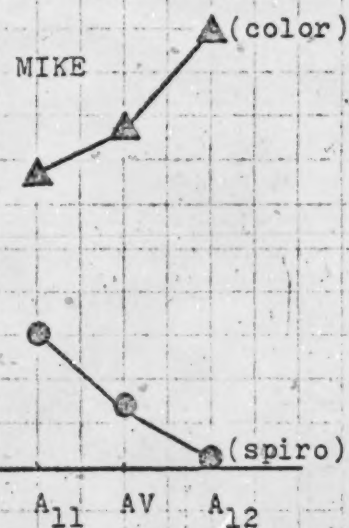
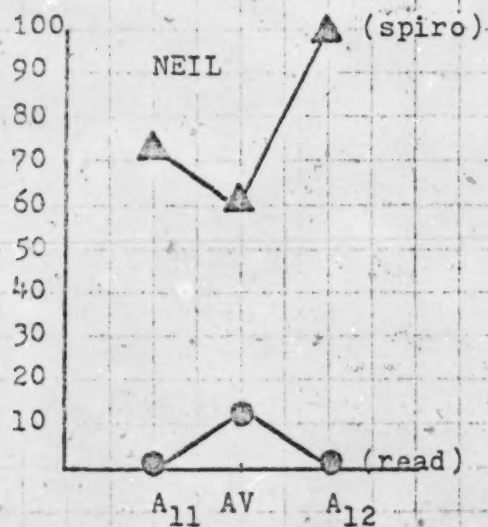
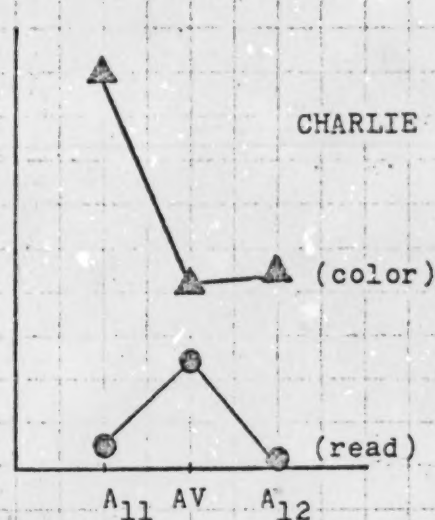
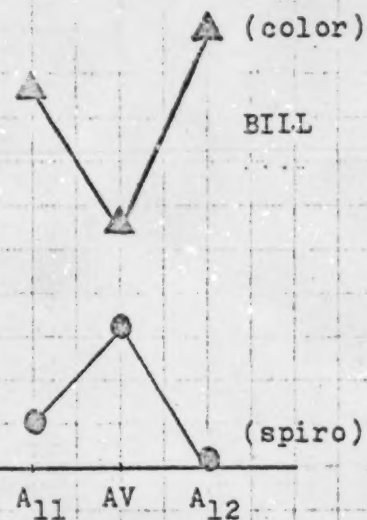
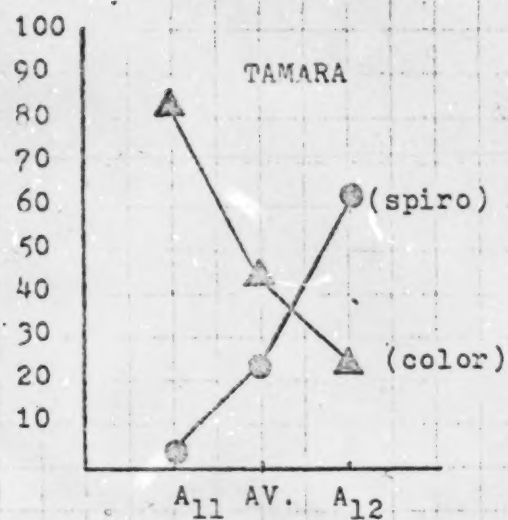


Figure 2.

Baseline levels of the two most preferred activities for a child

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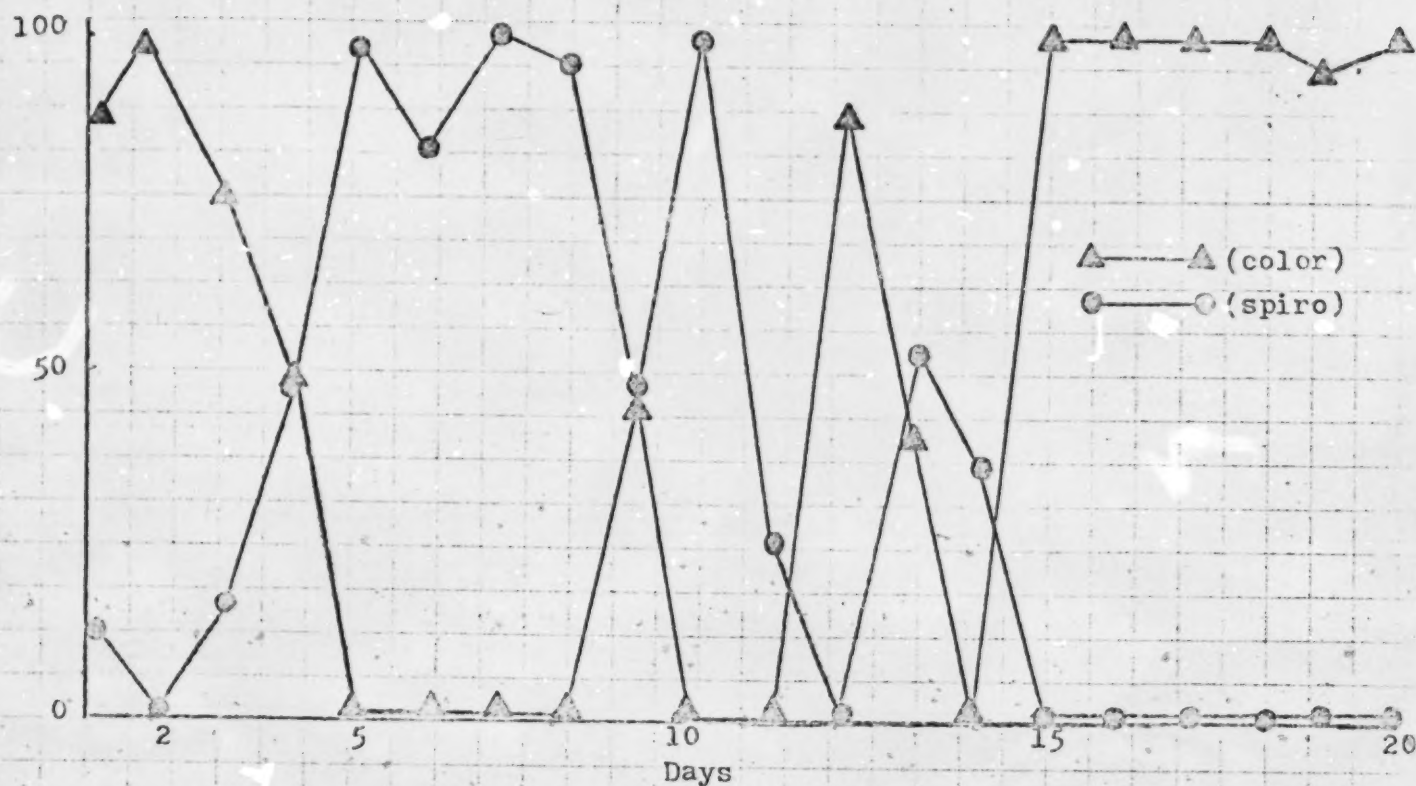
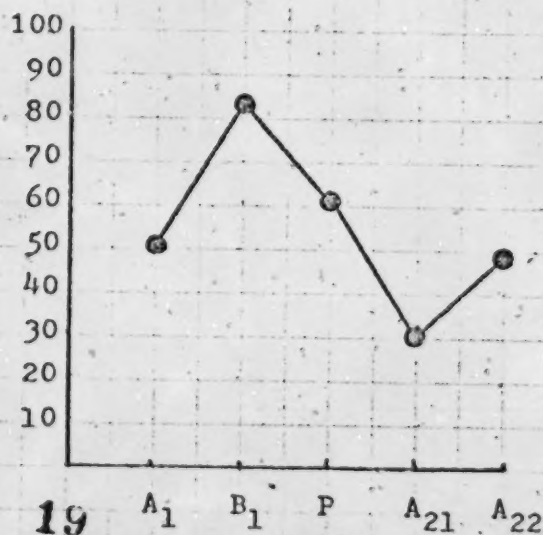


Figure 3.

Mean activity levels for the most preferred activity as a function of the treatment phases.



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Figure 3.
Individual activity levels for the two most preferred activities during each treatment phase.

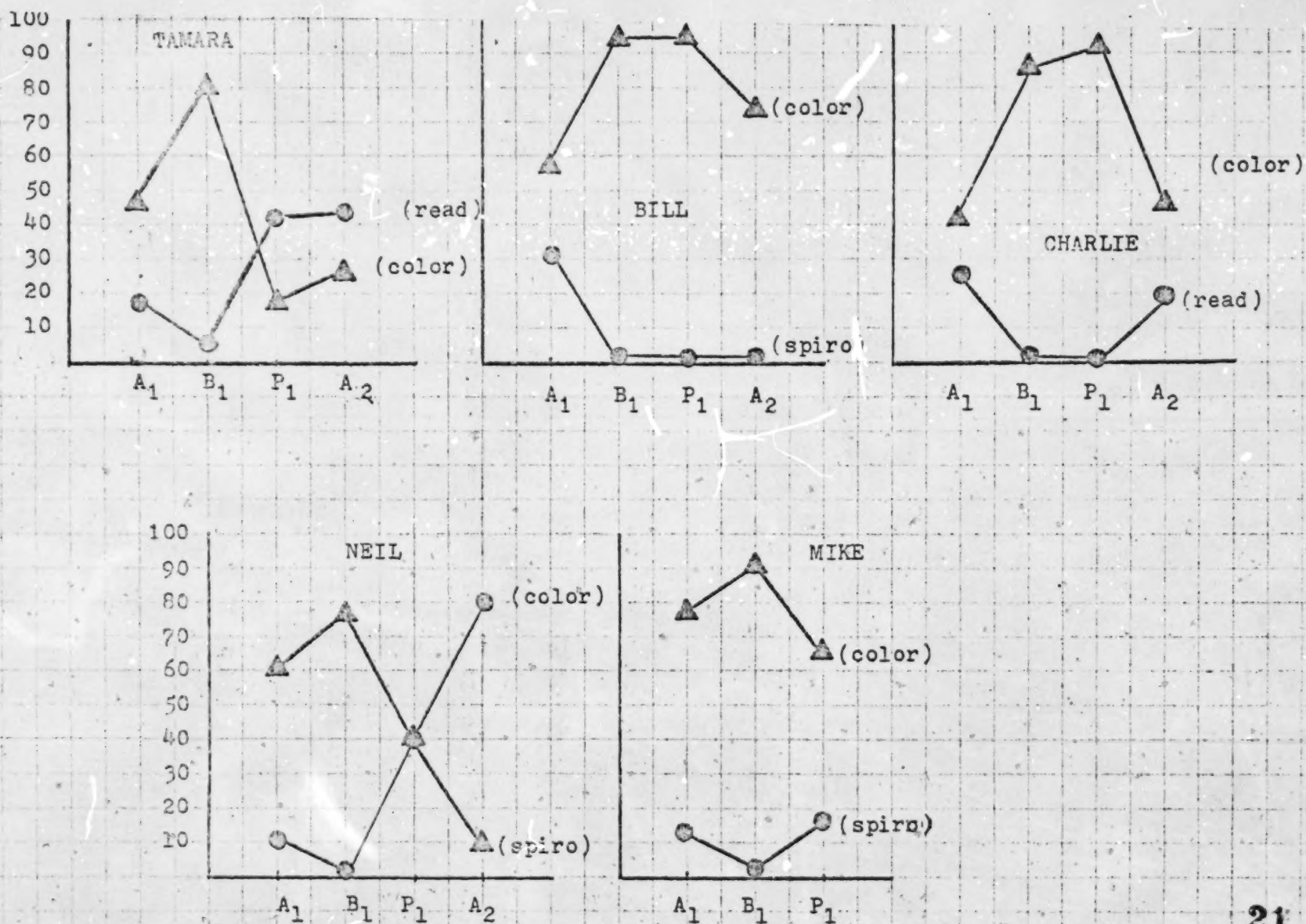


Figure 6.
Individual activity levels for two children
who received a second reinforcement phase.

